

**UNITED STATES DEPARTMENT OF COMMERCE****United States Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

*AS*

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

09/401,692 09/22/99 TATARAKA

P

<input type="checkbox"/>	IM52/0522	<input type="checkbox"/>
--------------------------	-----------	--------------------------

DENNIS M. MCWILLIAMS  
LEE, MANN, SMITH, MCWILLIAMS, SWEENEY &  
P.O. BOX 2786  
CHICAGO IL 60690-2786

IM52/0522

EXAMINER

TACKSON, M	
ART UNIT	PAPER NUMBER

1773  
DATE MAILED:

05/22/01

*T*

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/401,692	TATARAKA ET AL.
<b>Examiner</b>	<b>Art Unit</b>	
	Monique R Jackson	1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on \_\_\_\_ .

2a)  This action is **FINAL**.                    2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

4)  Claim(s) 1-108 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5)  Claim(s) \_\_\_\_\_ is/are allowed.

6)  Claim(s) 1-32, 43-84, and 86-108 is/are rejected.

7)  Claim(s) 33-42, 82-83, 85, and 106 is/are objected to.

8)  Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

11)  The proposed drawing correction filed on \_\_\_\_\_ is: a)  approved b)  disapproved.

12)  The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

15)  Notice of References Cited (PTO-892) 18)  Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_  
16)  Notice of Draftsperson's Patent Drawing Review (PTO-948) 19)  Notice of Informal Patent Application (PTO-152)  
17)  Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 and 3. 20)  Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Objections*

1. Claim 26 is objected to because of the following informalities: The claim recites "further comprising a gas barrier layer and said film has an oxygen transmission rate of less than 15 cc/100in<sup>2</sup> for 24 hrs at 1 atm" in lines 1-2, however, there is no literal support for this limitation in the specification. The specification recites on Page 71, lines 19-20, that the gas barrier layer has an oxygen transmission rate of less than 15 cc/100in<sup>2</sup> for 24 hrs at 1 atm, not the film.
2. Claims 33-42, 85 and 106/42 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only (See <sup>33</sup> claim 32, lines 1 and 15; claim 85, lines 1 and 2.) See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.
3. Claim 55 is objected to because of the following informalities: line 2, "of" or similar term should be inserted between "one" and "the". Appropriate correction is required.
4. Claims 82-83 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 82 and 83 are directed to properties of the resultant film and hence do not further limit the process.

### *Claim Rejections - 35 USC § 112*

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 1773

6. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 6 recites the limitation "selected from the group of ethylene vinyl acetate...and ethylene methacrylic acid copolymer" in lines 1-4. This limitation is in improper Markush format and hence does not provide the polymers in alternative form. The claim should recite "selected from the group **consisting of**...."

7. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 23 recites the limitation "said blend containing layer" in line 1. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 24 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 24 recites the limitation "the innermost heat sealable layer" in line 1. There is insufficient antecedent basis for this limitation in the claim.

9. Claims 32 and 70 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 32 and 70 recite the limitation "at least one interpolymer comprises said first and second polymers" in lines 1-2. However, it is not clear from this limitation whether the film comprises an interpolymer or at least one interpolymer comprising said first and second polymers.

10. Claim 43 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention. Claim 43 recites the limitation “said first layer” in line 1. There is insufficient antecedent basis for this limitation in the claim.

11. Claims 45-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 45-46 recites the limitation “said maximum puncture force” in line 1. There is insufficient antecedent basis for this limitation in the claim. It is noted that Claim 44 recites “a maximum **ram** puncture force”.

12. Claims 54-63 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 54 contains parenthetic expressions which render the claim indefinite for it is unclear whether the limitations contained in the parenthesis are part of the claimed invention. Further, it is noted that Claim 54 recites “said three copolymer blend” in lines 14-15. There is insufficient antecedent basis for this limitation in the claim.

13. Claims 65 and 66 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 65 and 66 recite the limitation “said maximum puncture force” in line 1. There is insufficient antecedent basis for this limitation in the claim.

14. Claim 86 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 86 contains parenthetic expressions which render the claim indefinite for it is unclear whether the limitations contained in the parenthesis are part of the claimed invention.

Art Unit: 1773

15. Claims 87-105 and 107-108 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 87 and 103 contain parenthetical expressions which render the claim indefinite for it is unclear whether the limitations contained in the parenthesis are part of the claimed invention. It is also noted that Claim 87 recites percentages in lines 10, 12, 13, 20, 22, and 23; and Claims 107 and 108 recite percentages in line 2 but the claims fail to provide a basis for these percentages. Further, Claim 104 recites the limitation "the layer weight" in lines 6-7 and Claim 107 recites the limitation "said layer" in line 2, however there is no clear antecedent basis for these limitations in the claims considering Claim 87 is directed to a film comprising four layers.

***Claim Rejections - 35 USC § 102***

16. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

17. Claims 1-21, 23-32, 43-52, 64-78, and 80-84 are rejected under 35 U.S.C. 102(e) as being anticipated by Wilhoit et al (USPN 5,928,740.)

18. Wilhoit et al teach a polymer blend and mono- and multilayer films made therefrom having improved properties such as heat sealing or puncture resistance wherein the blend has a first polymer of ethylene and at least one  $\alpha$ -olefin having a polymer melting point between 55

and 75°C; a second polymer of ethylene and at least one  $\alpha$ -olefin having a polymer melting point between 85 and 110°C; a third thermoplastic polymer having a melting point between 115 and 130°C; and optionally and preferred a fourth polymer having a melting point between 80-105°C (Abstract; 8:62-63.) Such blends are useful for making flexible films having heat sealing and puncture resistance properties and for making films particularly heat shrinkable, oriented films for packaging food and non-food articles (1:5-10.)

Various copolymers of ethylene and at least one  $\alpha$ -olefin are employed in the film of the invention. It is to be understood that the use of the term "copolymer of ethylene" means that the copolymer is predominantly comprised of ethylene and that at least 50% by weight of the copolymer is derived from ethylene monomer units in forming the copolymer. Suitable  $\alpha$ -olefins include C<sub>3</sub> to C<sub>10</sub>  $\alpha$ -olefins such as propene, butene-1, pentene-1, hexene-1, methylpentene-1, octene-1, decene-1 and combinations thereof. The invention contemplates use not only of bipolymers, but copolymers of multiple monomers such as terpolymers e.g. ethylene-butene-1-hexene-1 terpolymer. The ethylene  $\alpha$ -olefin copolymers used in the invention may have various molecular weights, molecular weight distributions Mw/Mn and melt indices. Typically, the ethylene  $\alpha$ -olefin copolymers used will have a melt index of less than 2 dg/min. (6:56-7:6.)

Wilhoit et al teach that the invention in all of its embodiments utilizes at least three different polymers having at least three different melting points. At least two, and preferably all three, of the required polymers of the inventive blend are ethylene  $\alpha$ -olefin copolymers. It is preferred that the three required polymers of the invention be present in an amount of at least 10% by weight each in the blend. It is believed that useful physical properties, especially heat

sealing range, are improved by selecting at least three polymers having melting points which are at least 5-10°C apart to provide melting characteristics over a broad temperature range which leads to a broadened heat sealing range and enhanced properties. The first and third polymers have peak melting points which are at least 40°C apart. (7:7-23.)

The first polymer of the blend has a melting point between 55 to 75°C, and comprises an ethylene  $\alpha$ -olefin copolymer. Examples of suitable first polymers include copolymers of ethylene with at least one  $C_3$  -  $C_{10}$   $\alpha$ -olefin, such as  $C_2C_4$  and  $C_2C_6$  copolymers. Exemplary suitable first polymers may have a density of 0.900 g/cm<sup>3</sup> or less, a melt index of about 1.5 dg/min. or less, and an Mw/Mn of less than 3, preferably about 2. It is preferred that the first polymer of the heat sealing layer comprise a copolymer of ethylene having a melt index between about 0.2 and 2 dg/min. Regarding the suitable amount to be employed of the first polymer in the blend, the first polymer may comprise at least 10% and preferably from about 20 to 35 weight % of the total weight of the required first, second and third polymer components, and preferably of the total polymer content of the polymer blend. Use of lesser amounts reduces shrinkability in those embodiments where heat shrinkability is desired and use of higher amount makes orientation more difficult and may increase extractable moieties to amounts which are undesirable for certain applications. When a preferred four component blend is used the first polymer will be present in an amount of from about 20 to 35% based upon the weight of the layer comprising the blend. (7:24-58.)

The second polymer of the blend has a melting point of from 85 to 110°C and comprises a copolymer of ethylene and at least one  $\alpha$ -olefin. Examples of suitable second copolymers include copolymers of ethylene and at least one  $C_3$  to  $C_{10}$   $\alpha$ -olefin, such as  $C_2C_4$ ,  $C_2C_6$ ,  $C_2C_8$

and C<sub>2</sub>C<sub>4</sub>C<sub>6</sub> copolymers. Exemplary suitable second polymers may have a density of at least about 0.900 g/cm<sup>3</sup> and higher, a melt index of 2 dg/min. or less, and a Mw/Mn of less than 3.5 preferably about 2. It is preferred that the second polymer of the heal sealing layer comprise a copolymer of ethylene having a melt index between about 0.5 and 2.5 dg/min. Regarding the suitable amount to be employed of the second polymer in the blend, the second polymer may comprise at least 10% and preferably from about 30 to 70 weight % of the total weight of the required first, second and third polymer components, and preferably of the total polymer content of the polymer blend. Use of lesser amounts reduces puncture resistance in those embodiments where puncture resistance is desired. When a preferred four component blend is used the second polymer will be present in an amount of from about 25 to 60%, preferably greater than 30%, based upon the total weight of the layer comprising the four polymer blend. (7:59-8:26.)

The third polymer of the blend has a melting point of from 115 to 130°C and comprises a thermoplastic polymer, preferably a copolymer of ethylene and at least one  $\alpha$ -olefin. Examples of suitable third polymers include copolymers of ethylene and at least one C<sub>3</sub> to C<sub>10</sub>  $\alpha$ -olefin, such as C<sub>2</sub>C<sub>4</sub>, C<sub>2</sub>C<sub>6</sub>, C<sub>2</sub>C<sub>8</sub> and C<sub>2</sub>C<sub>4</sub>C<sub>6</sub> copolymers; LDPE; HDPE; and propylene copolymers. Exemplary suitable third polymers may have a density of at least about 0.900 g/cm<sup>3</sup> and higher, a melt index of 2 dg/min or less; and a Mw/Mn of from about 2 to 12 or more, preferably greater than 3.5. It is preferred that the third polymer of the heal sealing layer comprise a polymer of ethylene having a melt index between about 0.2 and 2 dg/min. Regarding the suitable amount to be employed of the third polymer in the blend, the third polymer may comprise at least 10% and preferably from about 10 to 30 weight % of the total weight of the required first, second and third polymer components, and preferably of the total polymer content of the polymer blend.

Use of lesser amounts reduces heat sealing properties in those embodiments where heat sealability is desired and use of higher amounts reduces puncture resistance and may decrease shrinkability undesirably for certain applications. When a preferred four component blend is used the third polymer will be present in an amount of from about 10 to 30% based upon the weight of the layer comprising the blend. (8:26-61.)

The optional and preferred fourth polymer of the inventive blend has a melting point of from 80 to 105°C, preferably 90 to 100°C. Suitable fourth polymers that may be employed in the heat sealing layer of the monolayer and multilayer films include copolymers of ethylene and unsaturated esters having adhesive and/or heat sealing properties. Such copolymers are predominantly (>50 wt. %) ethylene. Suitable copolymers include ethylene vinyl esters and ethylene alkyl acrylates such as ethylene-vinyl acetate, ethylene-vinyl propionate, ethylene-methyl methacrylate, ethylene-ethyl methacrylate, ethylene-ethyl acrylate, and ethylene n-butyl acrylate. Preferred copolymers are ethylene-vinyl esters such as ethylene-vinyl acetate, ethylene-vinyl formate, ethylene-vinyl propionate, and ethylene-vinyl butylate. Especially preferred is ethylene-vinyl acetate (EVA). Many different EVA resins are commercially available having a wide range of vinyl acetate contents and melt flow indices. Suitable vinyl ester or alkyl acrylate content of the preferred fourth polymer components used in the invention include 4-28, preferably 4-18, weight percent vinyl ester or alkyl acrylate based on the total copolymer weight. It is preferred that the fourth polymer of the heat sealing layer comprise a copolymer of ethylene and a vinyl ester having a melt index between about 0.1 and 2 dg/min. It is preferred that the fourth polymer when present comprise from about 10 to 30 weight % of the

total weight of four polymer components, and preferably of the total polymer content of the polymer blend. (8:62-9:27.)

Wilhoit et al also teach that the above reported melt indices are initial values for the pelletized resins as received by the manufacturer. Crosslinking, especially irradiative crosslinking, is known to increase the average molecular weight by formation of longer chains of molecules than originally present. Therefore, crosslinking will also reduce the melt index of a polymer from its initial value to a lower value since the melt index is not only a measure of viscosity but also an indirect measure of molecular weight. (9:33-46.)

Advantageously, the invention utilizes a polymeric blend material in the heat sealing layer which has a broad range of melt behavior and characteristics which are believed to enhance seal formation and strength while providing excellent puncture resistance. Beneficially, such polymeric material may provide a broad combination of desirable properties having important commercial advantages for production and use thermoplastic films, particularly biaxially stretched films having heat shrinkability properties at 90.degree. C. Advantageously such films may have excellent puncture resistance, high shrinkability, high tensile strengths, good modulus, low haze, high gloss, excellent optical properties, and importantly a broad sealing range and good seal strength. An advantage of the invention is that use of the disclosed blends facilitates a broad heat sealing range for irradiated films. (9:47-10:12.)

Upon exposure to irradiation sufficient to cause cross-linking, heat sealable layers generally tend to diminish their heat sealing ability. However, an antioxidant may be added to the heat sealable inner layer of the tubular article to inhibit cross-linking within the polymer, thereby reducing the adverse effects of over-irradiation upon the heat sealing properties.

Addition of an antioxidant further allows the irradiation dosage to be sufficiently high to allow other layers of the multilayer film to retain the beneficial effects of irradiation. Beneficially, films of the present invention may be crosslinked by use of chemical agents or by irradiation, preferably at a level between 1 and 10 Mrad, more preferably 2-6 Mrad. (10:12-24.)

Wilhoit et al further teach that as generally recognized in the art, resin properties may be further modified by blending in additional resins or additives such as colorants, processing aids, antiblock agents and slip agents, etc. and it is contemplated that the specific polymer blends as described above may be further blended with resins such as very low density polyethylene (VLDPE), linear low density polyethylene (LLDPE), low density polyethylene (LDPE), high density polyethylene (HDPE), ionomers, polypropylene, ethylene acrylates or esters; or may be formed into multilayer films with one or more additional layers of such resins or blends thereof. The resins and others may be mixed by well known methods using commercially available tumblers, mixers or blenders. Also, if desired, well known additives such as processing aids, slip agents, antiblocking agents, pigments, etc., and mixtures thereof may be incorporated into the film into any or all layers. (10:32-48.)

In a preferred process for making films of the invention, the resins and any additives are introduced to an extruder (generally one extruder per layer) where the resins are melt plastified by heating and then transferred to an extrusion (or coextrusion) die for formation into a tube. Extruder and die temperatures will generally depend upon the particular resin or resin containing mixtures being processed and suitable temperature ranges for commercially available resins are generally known in the art, or are provided in technical bulletins made available by resin manufacturers. Processing temperatures may vary depending upon other process parameters

chosen. For example, according to the present invention, in extrusion or coextrusion of the polymer blends of the invention, barrel and die temperatures may range between about 145°C and 185°C. However, variations are expected which may depend upon such factors as variation of polymer resin selection, use of other resins e.g. in the blend or in separate layers in a multilayer film, the manufacturing process used, and particular equipment and other process parameters utilized. Actual process parameters including process temperatures are expected to be set by one skilled in the art without undue experimentation in view of the disclosure. (10:60-11:14.)

Blends of the invention may be manufactured into various useful articles e.g. cast films using e.g. a slot die, or conventional blown films where a tubular film is produced directly from the die melt, molded, thermoformed, blow molded sheets, rigid solid, hollow or foamed bodies may also be produced. In a preferred embodiment, extrusion by a trapped bubble or double bubble process may be utilized. In a preferred process for making an oriented or heat shrinkable film, a primary tube comprising the inventive plastic blend is extruded, and after leaving the die is inflated by admission of air, cooled, collapsed, and then preferably oriented by reinflating to form a secondary bubble with reheating to the film's orientation (draw) temperature range. Machine direction (M.D.) orientation is produced by pulling or drawing the film tube e.g. by utilizing a pair of rollers traveling at different speeds and transverse direction (T.D.) orientation is obtained by radial bubble expansion. The oriented film is set by rapid cooling. Suitable machine direction and transverse direction stretch ratios are from about 3:1 to about 5:1 with a ratio of about 4:1 preferred. (11:16-36.)

Films of the invention may be monolayer or multilayer films preferably of 10 mils or less and wherein the above blend comprises at least 50 percent by weight of a heat sealing layer comprising the blend. Multilayer films have the following preferred thicknesses. The thickness of the heat sealable inner thermoplastic first layer is typically between about 0.5 and about 2.0 mils. Thinner layers may perform the aforescribed functions, particularly in structures of 5 or more layers. The barrier layer thickness is preferably between about 0.1 and about 0.5 mils. Thinner barrier layers may not perform the intended functions and thicker layers do not appreciably improve performance. In the barrier layer embodiment of the invention, the outer thermoplastic layer of the multilayer film is on the opposite side of the core layer from the inner layer, and in direct contact with the environment. The outer layer is preferably formed of a blend of ethylene vinyl acetate as at least the major constituent, with preferably between about 3% and about 18% vinyl acetate content to provide good shrinkability. Alternatively, the outer layer may be formed of other thermoplastic materials as for example polyamide, styrenic copolymer, polypropylene, ethylene-propylene copolymer, ionomer, or an  $\alpha$ -olefin polymer and in particular a member of the polyethylene family such as linear low density polyethylene (LLDPE), very low density polyethylene (VLDPE and ULDPE), HDPE, LDPE, an ethylene vinyl ester copolymer or an ethylene alkyl acrylate copolymer or various blends of two or more of these materials (11:37-12:12; Claim 15.)

In the examples, all layers were extruded (coextruded in the multilayer examples) as a primary tube which was cooled upon exiting the die e.g. by spraying with tap water. This primary tube was then reheated by radiant heaters with further heating to the draw temperature (also called the orientation temperature) for biaxial orientation accomplished by an air cushion

which was itself heated by transverse flow through a heated porous tube concentrically positioned around the moving primary tube. Cooling was accomplished by means of a concentric air ring. The blended resins were melt plastified in an extruder and a monolayer thermoplastic tube was extruded. The extruder barrel and extrusion die temperature profile was set at about 335°F (168°C) to about 360°F (182°C). The extruded primary plastic tube was then cooled, reheated, biaxially stretched, and cooled according to a double bubble process and the resultant biaxially stretched film wound on a reel. The machine direction (M.D.) draw or orientation ratio was about 4.9:1 and the transverse direction (T.D.) bubble or orientation ratio was about 4.2:1. The draw point or orientation temperature is below the melting point for each layer to be oriented and above that layer's Vicat softening point. The draw point temperature of the film of example 1 is believed to have been about 160 to 175°F (71-79°C). Draw point temperature, bubble cooling rates and orientation ratios are generally adjusted to maximize bubble stability with use of higher throughput rates and lower draw point temperatures believed to provide films having higher puncture resistance relative to use of lower throughputs or higher orientation temperatures. (13:44-54; 14:24-44.)

In Example 1, the heat shrinkability of the fresh film was determined to be 46% in the machine direction (M.D.) and 54% in the transverse direction (T.D.) at 90°C. The film sample in Example 1 is also usefully crosslinked by irradiation e.g. at a level of 2-6 megarads (Mrad) after biaxial stretching, which irradiative process is referred to as post-irradiation. (14:46-61.)

In another aspect of the invention, one or more alternative layers having gas barrier properties may be incorporated into a multilayer film as either an intermediate or surface layer or both. For example, ethylene vinyl alcohol copolymer (EVOH), vinylidene chloride-methacrylate

copolymer, nylon such as nylon 6 or amorphous nylon, vinylidene chloride-vinyl chloride copolymer, acrylonitriles or other materials having oxygen barrier properties may be used in one or more layers such as the core layer. Blends of resins having gas barrier properties may also be used e.g. a blend of nylon with EVOH. Typical gas barrier films will have a gas barrier layer having an oxygen transmission of less than 15cc/100in<sup>2</sup> for 24 hrs at 1 atm. Wilhoit et al specifically teach a biaxially stretched, heat shrinkable film having at least three layers comprising a first layer comprising the above blend, a third layer comprising at least 50 percent by weight of a copolymer of ethylene with at least one  $\alpha$ -olefin or at least one vinyl ester or blends thereof; and a second layer between said first and third layers comprising a vinylidene chloride copolymer, a nylon, or a copolymer of ethylene with a vinyl alcohol (19:32-43; Claim 16.)

Therefore, considering the film taught by Wilhoit et al comprises the same materials as the instantly claimed invention and is produced by the method as instantly claimed, the film would inherently have film properties, such as maximum ram puncture force, tear propagation strength, shrinkage, haze, etc., within the instantly claimed ranges.

***Claim Rejections - 35 USC § 103***

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Alternatively, Claims 1-21, 23-32, 43-52, 64-78, and 80-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilhoit et al. The teachings of Wilhoit et al are

discussed above. Though Wilhoit et al do not limit the ethylene copolymer having a melting point between 85 and 110°C to a copolymer of ethylene and hexene-1 or a terpolymer of ethylene-hexene-1-butene-1 or ethylene-hexene-1-octene-1, Wilhoit et al clearly disclose such copolymers and terpolymers. Specifically, Wilhoit et al teach that the ethylene copolymer are ethylene  $\alpha$ -olefin copolymers wherein suitable  $\alpha$ -olefins include C<sub>3</sub> to C<sub>10</sub>  $\alpha$ -olefins such as propene, butene-1, pentene-1, hexene-1, methylpentene-1, octene-1, decene-1 and combinations thereof. The invention contemplates use not only of bipolymers, but copolymers of multiple monomers such as terpolymers e.g. ethylene-butene-1-hexene-1 terpolymer. Further, Wilhoit et al teach that the composition of the blend and the melting points of the various polymers in the blend have a direct affect on the film properties of the resultant film such as sealing strength, puncture resistance, haze, etc. Hence, in the absence of a showing of unexpected results, it would have been obvious to one having ordinary skill in the art to select from the ethylene copolymers or terpolymers taught by Wilhoit et al optimizing the melting points of the polymers and the composition of the selected ethylene copolymers in the blend to provide the desired film properties for a particular end use.

20. Claims 22, 53-63, 79 and 86-108 are rejected under 35 U.S.C. 103(a) as obvious over Wilhoit et al. The teachings of Wilhoit et al are discussed in detail above. Wilhoit et al teach that the polymer blend can be used to form multi-layer films. Specifically Wilhoit et al teach as generally recognized in the art, resin properties may be further modified by blending in additional resins or additives such as colorants, processing aids, antiblock agents and slip agents, etc. and it is contemplated that the specific polymer blends as described above may be further blended with resins such as very low density polyethylene (VLDPE), linear low density

polyethylene (LLDPE), low density polyethylene (LDPE), high density polyethylene (HDPE), ionomers, polypropylene, ethylene acrylates or esters; or may be formed into multilayer films with one or more additional layers of such resins or blends thereof. The resins and others may be mixed by well known methods using commercially available tumblers, mixers or blenders (10:32-48.) The multilayer film may comprise barrier layers or outer layers wherein the outer layer is preferably formed of a blend of ethylene vinyl acetate as at least the major constituent, with preferably between about 3% and about 18% vinyl acetate content to provide good shrinkability. Alternatively, the outer layer may be formed of other thermoplastic materials as for example polyamide, styrenic copolymer, polypropylene, ethylene-propylene copolymer, ionomer, or an  $\alpha$ -olefin polymer and in particular a member of the polyethylene family such as linear low density polyethylene (LLDPE), very low density polyethylene (VLDPE and ULDPE), HDPE, LDPE, an ethylene vinyl ester copolymer or an ethylene alkyl acrylate copolymer or various blends of two or more of these materials (11:37-12:12; Also, the multilayer film may comprise one or more alternative layers having gas barrier properties may be incorporated into a multilayer film as either an intermediate or surface layer or both. For example, ethylene vinyl alcohol copolymer (EVOH), vinylidene chloride-methacrylate copolymer, nylon such as nylon 6 or amorphous nylon, vinylidene chloride-vinyl chloride copolymer, acrylonitriles or other materials having oxygen barrier properties may be used in one or more layers such as the core layer. Blends of resins having gas barrier properties may also be used e.g. a blend of nylon with EVOH (19:32-43.) Wilhoit et al specifically teach that various properties of the film can be modified or enhanced based on the composition of the film or film layers. Hence, though Wilhoit et al do not specifically teach that the multilayer film comprises at least three additional

Art Unit: 1773

layers or at least four additional layers or the layer combinations as instantly claimed, in the absence of a showing of unexpected results, it would have been obvious to one having ordinary skill in the art at the time of the invention to optimize the number of layers, the layer materials, and the order of the layers, based on the teachings of Wilhoit et al, to provide the desired film properties such as barrier or mechanical properties for a particular end use.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monique R Jackson whose telephone number is 703-308-0428. The examiner can normally be reached on Mondays-Thursdays, 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul J Thibodeau can be reached on 703-308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-5436 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

  
mrj  
May 18, 2001